

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2 A & B, Raja S. C. Mullick Road, Jadavpur, Kolkata-32



OPEN THESIS COLLOQUIUM

Title : " Hilbert Space Fragmentation: en route to ETH Violation and Reality"
Speaker : Somsubhra Ghosh (Supervisor: Prof. K.Sengupta)
Date : May 31,2024 (Friday)
Time : 11:30 HRS (IST)
Venue : Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS

Abstract : For the past few years, Hilbert space fragmentation (HSF) has been proposed as an avenue to evade thermalization in isolated quantum systems. However, so far, HSF has only been realized in equilibrium systems, where constraints imposed a priori lead to fragmentation. In the first part of my talk, I shall discuss a periodically driven one-dimensional fermionic chain with nearest-neighbor hopping and density-density interaction. I shall argue that such a driven chain exhibits prethermal strong HSF in the high drive amplitude regime at specific drive frequencies $\omega * m$. In this case, the constraints emerge naturally as a result of the periodic drive. This constitutes the first realization of HSF for out-of-equilibrium systems. In the second part of my talk, I shall discuss another unexplored consequence of HSF, namely to yield real eigenvalues of non-Hermitian systems. I shall consider the interacting Hatano-Nelson chain as an example and show that the reality of eigenvalues at large interaction strengths is a consequence of HSF and protection by global symmetries.

All are cordially invited to attend.